

Abstract for 2013 AGU Fall Meeting

The meteorology of storms that produce narrow bipolar events

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Narrow Bipolar Events (NBEs) are compact intracloud discharges that produce the most powerful lightning-related radio frequency signals that have been observed. However, their luminosity is below the threshold for detectability from current and past spaceborne optical sensors. NBEs have been loosely associated with convective intensity, but their occurrence tends to be highly localized in time and space within a thunderstorm, and there remain many questions about whether and to what extent they are significantly related to meteorological processes within thunderstorms. Using the North Alabama Lightning Mapping Array (NALMA), the National Lightning Detection Network, and available Doppler and polarimetric radar data, case studies will be presented for storm events that produced large numbers of NBEs (~10s-100s) during their lifetimes. NBEs are documented via a method that identifies high peak power (>40-50 dBW) initial VHF sources within a specific altitude band in the upper levels of thunderstorms. The production of NBEs, including spatial and temporal variability, will be compared to the radar-inferred kinematic and microphysical structure and evolution of thunderstorms, as well as their NALMA- and NLDN-inferred electrical characteristics. The results should provide new insights into the relationships between NBEs and thunderstorm processes.